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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/287,573	04/06/1999	DAVID R. WALT	A-67207-2/DJB/RMS/DCF	6459

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EXAMINER	
GABEL, GAILENE	
ART UNIT	**PAPER NUMBER**
1641	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	03/19/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 03/19/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	09/287,573	WALT ET AL.	
	Examiner	Art Unit	
	Gailene R. Gabel	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *16-27 and 29-48* is/are pending in the application.

4a) Of the above claim(s) *16-19,23-26,40-45 and 48* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *20-22, 27, 29-39, 46, and 47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *16-27 and 29-48* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Amendment Entry

1. Applicant's amendment and arguments filed on December 21, 2006 are acknowledged and have been entered. Claim 27 has been amended. Claims 16-19, 23-26, 40-45, and 48 remain withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being claims drawn to a non-elected invention. Currently, claims 16-27 and 29-48 are pending. Claims 20-22, 27, 29-39, 46, and 47 are under examination.

Rejections Withdrawn

2. All rejections not reiterated herein have been withdrawn.

3. In light of Applicant's submission of Terminal Disclaimer, the nonstatutory obviousness-type double patenting rejection of claims 20-22, 27, 29-39, 46, and 47 as being unpatentable over claims 39-48 of US Patent 7,115,884 in view of Bierre et al. (US Patent 5,739,000), is hereby, withdrawn.

4. In light of Applicant's amendment, the rejection of claims 20-22, 27, 29-39, 46, and 47 under 35 U.S.C. 112, second paragraph, is hereby, withdrawn.

Maintained Rejections

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 27, 29-39, and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinkel et al. (US Patent 5,837,196) in view of Bierre et al. (US Patent 5,739,000) for reasons of record and as follows.

Pinkel et al. disclose a method of individual and simultaneous measurements of target analytes in an optical fiber array having a plurality of subpopulations of identical sensor elements (optical fibers bundled together bearing a single type species). Pinkel et al. specifically teach contacting the optical fiber array with a sample comprising a target analyte and then detecting production of response signals. Each sensor element is uniquely addressed and each subpopulation bears distinct bioactive agents (biological binding partner); the optical fiber array bears multiple species of bioactive agents (see column 3, line 39 to column 4, line 26 and column 14, lines 36-43). The bioactive agents include nucleic acids, oligonucleotides, and proteins (see column 3, lines 8-22, column 4, lines 27-34 and 55-67 and column 6, lines 30-39). Pinkel et al. provide that use of concave or convex sensor ends results to a greater surface area upon which to immobilize the bioactive agents to thus, increase the signal to noise ratio per optical fiber of the biosensor (see column 8, lines 22-25). The substrate is either glass or plastic (see column 11, lines 50-55). The detector can be arranged to read individual response signals simultaneously, i.e. first and second measurements, from a single sensor element of the optical fiber or from a group of sensor elements from a population or bundle of optical fibers (see column 9, lines 23-57). The detector system

may be equipped with a computerized data acquisition system and analytical program to enable a variety of different measurements to be made and diverse parameters to be measured (see column 13, lines 33-56). By examining the uniquely addressed transmission ends of fibers or groups of fibers, the addressed transmission ends can transmit unique patterns for rapid identification and measurement of target analytes by the sensor (see column 4, lines 21-25).

At column 12, line 66 bridging to column 13, line 5, Pinkel et al. specifically teach that "the transmission ends may be addressed by attaching the transmission end of each optical fiber or bundle of optical fibers, bearing a particular binding partner to an individual detector. Each detector is subsequently known to be associated with a particular biological binding partner and there is no need to preserve a fixed spatial relationship between any of the transmission ends." Pinkel et al. teach that "the detector is *preferably arranged* to read the signal from single optical fibers or from groups of optical fibers where all the optical fibers in a group bear the same species of biological binding partner." "A CCD or other camera is focused at the transmission face of the biosensor to simultaneously read signals from all of the optical fibers while permitting individual evaluation of the signal from each fiber or groups of fibers" (column 9, lines 37-41 and 44-48). At column 8, lines 26-30, Pinkel et al. provide that "while the single repeating component of the fiber optic biosensor is the individual optical fiber, it is the aggregation of a plurality of such fibers to form a discrete optical fiber array that permits the simultaneous detection of a multiplicity of analytes."

Pinkel et al. differ from the instant invention in failing to teach performing statistical analysis of the response signals obtained from each individual sensor element, so that statistical validity of the response signals can be determined.

Bierre et al. disclose a method of multiparameter data analysis which employs analyzing data by construction of a population hierarchy, wherein cell populations are not mutually exclusive. Bierre et al. specifically obtained measurements to collect a plurality of parameters for each particle (bead) in a sample and performed statistical analysis on the obtained measurements. Statistical analyses performed include calculating a mean and standard deviation for the measurements, evaluating statistical validity of the measurements by defining and selecting particles into mutually exclusive clusters and subclusters, i.e. cluster analysis, and repeating statistical analysis for purposes of comparing and evaluating confidence intervals between measurements. See claims 1-3, 6, 11, and 12.

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to incorporate the teaching of statistical analysis of data as taught by Bierre into the optical fiber array method of Pinkel wherein sensor elements are uniquely addressed and where each subpopulation may bear same or distinct bioactive agents because Pinkel specifically recognized the need for inherent means to calibrate against an internal standard present within an array system (column 1, lines 48-53) and Bierre provided applicability of statistical analysis of data for methods as that taught by Pinkel. Additionally, statistical analysis, i.e. calculating mean/average, standard deviation, precision/ repeatability of a method as reflected in a second analysis,

confidence intervals, correlation studies, and distribution/cluster analysis, is standard laboratory practice and required in optimization procedures; hence, it would have been obvious for one of ordinary skill to use statistical analysis strategies known and conventionally used in chemical and immunological art to evaluate measurements obtained from any known high-density biosensor assay method.

6. Claims 20-22 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinkel et al. (US Patent 5,837,196) in view of in view of Bierre et al. (US Patent 5,739,000), as applied to claims 27, 29-39 and 47 above, and in further view of Stimpson et al. (US Patent 5,559,668) for reasons of record and as follows.

Pinkel et al. and Bierre et al. have been discussed supra. Pinkel et al. and Bierre et al. differ from the instant invention in failing to teach that the sensor elements are beads in an array dispersed on a substrate selected from glass or plastic.

Stimpson et al. disclose a waveguide binding assay method wherein an array comprising a plurality of subpopulations of light scattering beads (particles) are sensor elements for binding with target analytes (see Abstract and column 16, lines 27-64). The beads are colloidal metals such as gold and are dispersed on a substrate (waveguide or element) composed of either plastic or glass (see column 10, lines 33-59). Stimpson et al. also disclose that location of each of sensor element within the arrays can be configured, located, and identified (see columns 11 and 12).

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to incorporate the light scattering beads for use as sensor elements as

taught by Stimpson into the optical fiber array used in the method of Pinkel as modified by Bierre because Stimpson specifically taught that light scattering beads, used as sensor elements, can increase acquisition of data or results by two orders of magnitudes by simultaneous interrogation; thus, allowing simultaneous measurements of the beads at multiple sites of an array and permitting extremely rapid acquisition of data.

Response to Arguments

7. Applicant's arguments filed December 21, 2006 have been fully considered but they are not persuasive.

Applicants maintain that neither Pinkel nor Bierre, alone or in combination even with Stimpson, teach or suggest the claimed invention which they deem as fully patentable over the prior art of record. According to Applicant, Pinkel does not teach or suggest methods of obtaining individual signals from sensor elements in response to an analyte, where the sensor elements comprise identical bioactive agents. Applicant contends that the section of the Pinkel patent (column 9, lines 46-48) that is alleged to disclose such methods only describes obtaining signals "from a group of optical fibers where all the optical fibers in a group bear the same species of biological binding partner."

In response, Applicants appear to be selective in their interpretation of the preferred embodiment of the Pinkel teaching at column 9, lines 44-48, in limiting the

statement to mean "obtaining signals ... from single optical fibers (supposedly where all the optical fibers in a group bear different species of biological binding partner) or from groups of optical fibers where all the optical fibers in a group bear the same species of biological binding partner". Pinkel therein teaches that "the detector is *preferably arranged* to read the signal from single optical fibers or from groups of optical fibers where all the optical fibers in a group bear the same species of biological binding partner."

In reading the Pinkel reference in its entirety, such limiting interpretation by Applicant does not appear to be sum-totally reflective of what is encompassed within the entire disclosure. Pinkel's disclosure reserves open myriads of different embodiments and possibilities provided by the many advantages set forth in the design of their invention, albeit suggestive of certain preferred embodiments.

A) Specifically at column 12, line 66 bridging to column 13, line 5, Pinkel teaches that "the transmission ends may be addressed by attaching the transmission end of each optical fiber or bundle of optical fibers bearing a particular binding partner to an individual detector. Each detector is subsequently known to be associated with a particular biological binding partner and there is no need to preserve a fixed spatial relationship between any of the transmission ends." Herein, Pinkel teaches that the transmission end of each optical fiber [or bundle of optical fibers] bearing a particular binding partner is attached to an individual detector, providing that each optical fiber is individually detected and may bear any particular binding partner. The teaching of

Pinkel in this citation is not limited to the signal being read from an individual optical fiber when each fiber bears distinct species of biological binding partners or being read as a group of optical fibers when each of the fibers bear the same species of biological binding partner.

B) At column 9, lines 37-41, Pinkel teaches that "a CCD or other camera may be focused at the transmission face of the biosensor to simultaneously read signals from all of the optical fibers while permitting individual evaluation of the signal from each fiber or groups of fibers." In this citation, Pinkel does not place any regard as to whether each fiber or group of fibers, bears a same or different species of biological binding partner in permitting individual evaluation of the signals obtained.

C) At column 8, lines 26-30, Pinkel provides that "While the single repeating component of the fiber optic biosensor is the individual optical fiber, it is the aggregation of a plurality of such fibers to form a discrete optical fiber array that permits the simultaneous detection of a multiplicity of analytes." Again, Pinkel does not place specific emphasis on each fiber or group of fibers, bearing a same or different species of biological binding partner in permitting individual evaluation of the signals obtained.

Accordingly, the Pinkel reference does not appear to be mutually exclusive in design so as to intend limiting his teaching to detecting and obtaining signals (using individual detectors) from single optical fibers only where all the optical fibers in a group bear different species of biological binding partner, or from groups of optical fibers only where all the optical fibers in a group bear the same species of biological binding

partner. Although Pinkel provides statements suggestive of such preferred embodiments, a comprehensive review of the disclosure unearths a design that permits inherent embodiments which certainly includes "obtaining signals from single optical fibers having individual detectors" albeit bearing same species of biological binding partners.

8. Having taken the Pinkel reference further into consideration as primary reference in the obviousness rejections discussed supra, it has been maintained that claims 20-22, 27, 29-39, 46, and 47 are deemed obvious over the prior art of record. Accordingly, no claims are allowed.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gailene R. Gabel whose telephone number is (571) 272-0820. The examiner can normally be reached on Monday, Tuesday, and Thursday, 7:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long V. Le can be reached on (571) 272-0823. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov/>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gailene R. Gabel
Patent Examiner
Art Unit 1641
March 12, 2007